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भारतीय मानक

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भाग 1 घरेलू और सजावटी प्रयोग के लिए

(पहला पुनरीक्षण)

Indian Standard

READY MIXED PAINT, AIR DRYING, RED OXIDE — ZINC PHOSPHATE, PRIMING — SPECIFICATION

PART 1 FOR DOMESTIC AND DECORATIVE APPLICATIONS

(First Revision)

ICS 87.040

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BUREAU OF INDIAN STANDARDS
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NEW DELHI 110002

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Paints, Varnishes and Related Products Sectional Committee CHD 20

FOREWORD

This Indian Standard (Part 1) (First Revision) was adopted by the Bureau of Indian Standards, after the draft finalized by the Paints, Varnishes and Related Products Sectional Committee had been approved by the Chemical Division Council.

This standard was first published in 1989. This specification was formulated keeping in view the increased trend of the use of zinc phosphate based primers as anti-corrosive primer in place of zinc chome pigment, in view of health hazards associated with the production of chome pigments. It was found by experimental results that when based on good quality medium and extender, the composition gives a matching anti-corrosive performance to zinc chome.

Revision of this standard has been taken up with a view to incorporate the limit of lead restriction in this standard. The Committee responsible for formulation of this standard observed that in practice some paints like this paint are used for household/decorative as well as in industrial/commercial applications. Taking cognizance of the fact that lead exposure of human being, particularly children in residential premises is injurious to health and having adverse impact on human health and safety, the Committee felt the need to introduce lead restriction in all paint standards likely to be used for household and decorative purposes. The Committee also felt that there is no need for lead restriction in paints meant exclusively for industrial/commercial applications.

The Committee observed that this paint have dual applications, namely usage for household/decorative purposes and usage for industrial/commercial applications. Keeping this in perspective, the Committee decided to bifurcate the existing specification into two parts namely Part 1 of the standard for household/decorative purposes and Part 2 of the standard for commercial/industrial applications.

The Committee observed that this primer is used for protection of grill, gates, window frames (Metal), etc, in houses and buildings and it is technologically feasible to formulate this product with very low maximum permissible limit of lead. Therefore, in this standard, lead restriction up to a maximum permissible limit of 90 ppm has been prescribed keeping in view to use this product for painting in houses and buildings. This is more so to prevent lead exposure of children and adults in consumer homes/ residential premises and consequent adverse impact on human health and safety and also keeping in view of the further scope for exposure to children to the paint once dried. Further, majority of consumers are not aware of the consequences of lead toxicity and its long term implications to human health. Therefore, in this revision, along with lead restriction, a suitable cautionary notice has been included in the marking clause.

The Committee responsible for formulation of this standard is given in Annex D.

For the purpose of deciding whether a particular requirement of this standard is complied with the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 ‘Rules for rounding off numerical values (*revised*)’. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

READY MIXED PAINT, AIR DRYING, RED OXIDE — ZINC PHOSPHATE, PRIMING — SPECIFICATION

PART 1 FOR DOMESTIC AND DECORATIVE APPLICATIONS

(First Revision)

1 SCOPE

This standard (Part 1) prescribes the requirements and methods of sampling and test for the material commercially known as ready mixed paint, red oxide-zinc phosphate, priming. The material is suitable for use, as a primer in the painting system for the protection of steel work, both under marine and inland outdoor conditions and for household/decorative purposes.

2 REFERENCES

The standards listed in Annex A contains provisions which though reference in this text, constitute provisions of this standard. At the time of publication, the editions indicated were valid. All standards are subject to revision and parties to agreements based on this standard are encouraged to investigate the possibility of applying the most recent editions of the standards indicated in Annex A.

3 TERMINOLOGY

For the purpose of this standard, the definitions given in IS 1303 shall apply.

4 CLASSES

The material shall be supplied in brushing consistency but shall be suitable for application by spraying after thinning with petroleum hydrocarbon solvent, 145/205, low aromatic grade (*see* IS 1745). The smell of the material shall not be objectionable during application.

5 REQUIREMENTS

5.1 Composition

5.1.1 *Raw Materials*

The following raw materials used in the formulation of paint according to this specification shall be tested by relevant methods prescribed in specifications indicated against each:

a) *Zinc Phosphate* — *See* IS 10897.
b) *Red oxide of iron* (natural and/or manufactured) — *See* **2** or **3** of IS 44.
c) Oil or turpentine.
d) *Petroleum hydrocarbon solvent* — *See* IS 1745.
e) *Liquid drier* — *See* IS 8766.

5.1.2 *Paint Formulation*

Paint shall be formulated with suitable pigments, unsaponifiable varnish medium, solvent thinners and driers in suitable proportions so as to satisfy the requirements prescribed in Table 1.

5.2 Lead Restriction

The material shall be tested for restriction from lead in accordance with IS 101 (Part 8/Sec 5). When thus tested the material shall not contain lead or compounds of lead or mixtures of both, calculated as metallic lead exceeding 90 ppm.

5.3 The material shall also comply with the requirements given in Table 1.

6 PACKING AND MARKING

6.1 Packing

Unless otherwise agreed to between the purchaser and the supplier, the paint shall be packed in metal containers conforming to IS 1407 or IS 2552. The packing is subject to the provisions of the law in force in the country at that time.

6.2 Marking

The containers shall be marked with the following particulars:

a) Name of the material;
b) Indication of the source of manufacture;
c) Lead content (Maximum);
d) Volume of the material;
e) Batch number or Lot number in code or otherwise;
f) Month and year of manufacture;
g) Colour/ shade of the material; and
h) A cautionary note as below:
    1) Keep out of reach of children;

2) Dried film of this paint may be harmful if eaten or chewed; and
3) This product may be harmful if swallowed or inhaled.

6.3 BIS Certification Marking

The containers may also be marked with the Standard Mark.

6.3.1 The use of the Standard Mark is governed by the provisions of the *Bureau of Indian Standards Act,* 1986 and the Rules and Regulations made there under. The details of conditions under which a licence for the use of the Standard Mark may be granted to manufacturers or producers may be obtained from the Bureau of Indian Standards.

6.4 Other details of packing and marking shall be in accordance with the instructions given by the purchaser.

7 SAMPLING

7.1 Representative samples of the material shall be drawn as prescribed in IS 101 (Part 1/Sec 1).

7.2 Preparation of Test Samples

7.2.1 *For Drying Time*

Prepare mild steel panel of sizes 150 mm × 100 mm × 1.25 mm as prescribed in **2** of IS 101 (Part 1/Sec 3). Apply the paint uniformly on each side of the panel by brushing to give a dry film mass commensurate with the mass per 10 litre as specified in Table 1 of IS 101 (Part 3/Sec 4). Prepared test panel then subjected to the test as specified in IS 101 (Part 3/Sec 1) as soon as possible.

7.2.2 *For Flexibility and Adhesion Test*

For both bend test and scratch hardness test prepare separate burnished tin plate panels, rectangular, of sizes 100 mm × 50 mm × 0.3 mm as prescribed in **3** of IS 101 (Part 1/Sec 3). Apply one coat of material by brushing on the panels as to give a dry film mass commensurate with the mass per 10 litre as specified in Table 1 of IS 101 (Part 3/Sec 4). The coated test panels shall be dried for 48 h and then shall be conditioned at a temperature of 27 ± 2°C and relative humidity of 65 ± 5 percent for

Table 1 Requirements For Ready Mixed Paint, Red Oxide-Zinc Phosphate, Priming

(*Clause* 5.3 *and* 8.1)

Sl No.	Characteristic	Requirement	Method of Test, Ref to	
			IS 101/Other Standard	Annex
(1)	(2)	(3)	(4)	(5)
i)	Drying time, hard dry, *Max*	18 h	(Part 3/Sec 1)	—
ii)	Consistency	Smooth and uniform and passes the test	—	B
iii)	Finish	Smooth and matt, or eggshell flat	(Part 3/Sec 4)	—
iv)	Colour in natural daylight	That of red oxide	Clause **2** of (Part 4/Sec 2)	—
v)	Wet opacity	Between – 10 percent and +20 percent of the approved sample or the value declared by the manufacturer	(Part 4/Sec 1)	—
vi)	Pigment content, percent by mass	50 ± 5	(Part 8/Sec 2)	—
vii)	Zinc phosphate, percent by mass on pigment, *Min*	16.0	—	C
viii)	Red oxide (as Fe_2O_3), percent by mass on pigment, *Min*	50	Clause **6** of IS 6947 (Part 2)	—
ix)	Flexibility and adhesion			
	a) Scratch hardness (Load 800 g)	No such scratch as to show the bare metal	Clause **3** of (Part 5/Sec 2)	—
	b) Bend test (with 6.25 mm dia mandrel in type 1 apparatus)	No visible damage or detachment	Clause **2** of (Part 5/Sec 2)	—
x)	Resistance to humidity under conditions of condensation:			
	a) Resistance to humidity (for 7 days)	To pass the test	Clause **2** of (Part 6/Sec 1)	—
	b) Resistance to salt spray to (for 96 h)	Pass the test	Clause **3** of (Part 6/Sec 1)	—
xi)	Flash point, *Min*, °C	30	(Part 1/Sec 6)	—
xii)	Mass, in lig/10 litre, *Min*	13.5 however, it shall be within ± 3 per cent of the approved sample, if any	(Part l/Sec 7)	—
xiii)	Keeping properties	Not less than one year from the date of manufacturing	(Part 6/Sec 2)	—

a minimum time of 16 h. Prepared test panels the subjected to the test as prescribed in **2** and **3** of IS 101 (Part 5/Sec 2) for bend test and scratch hardness test respectively.

7.3 Criteria for Conformity

A lot shall be declared as conforming to the requirements of this standard, if the test results of the composite samples satisfy the requirements as prescribed in **5.1** to **5.2**.

8 TEST METHODS

8.1 Tests shall be conducted as prescribed in **5.1** to **5.2** and the test methods referred in co1 4 and col 5 of Table 1.

8.2 Quality of Reagents

Unless otherwise specified, pure chemicals and distilled water (*see* IS 1070) shall be employed in tests.

NOTE — 'Pure chemicals' shall mean chemicals that do not contain impurities which affect the results of analysis.

ANNEX A

(*Clause* 2)

LIST OF REFERRED INDIAN STANDARDS

IS No.	*Title*
44: 1991	Iron oxide pigments for paints — Specification (*second revision*)
101	Methods of sampling and test for paints, varnishes and related products
(Part 1)	Test on liquid paints (general and physical)
(Sec 1) : 1966	Sampling (*third revision*)
(Sec 3) : 1986	preparation of panels (*third revision*)
(Sec 6) : 1987	Flash point (*third revision*)
(Sec 7) : 1987	Mass per 10 litre (*third revision*)
(Part 3)	Tests on paint film formation,
(Sec 1) : 1986	Drying time (*third revision*)
(Sec 4) : 1987	Finish (*third revision*)
(Part 4)	Optical tests on paint films
(Sec 1) : 1988	Wet opacity (*third revision*)
(Sec 2) : 1989	Colour (*third revision*)
(Part 5 : Sec 2) :	Mechanical tests on paint films
1988	Flexibility and adhesion (*third revision*)
(Part 6)	Durability tests on paint films
(Sec 1) : 1988	Resistance to humidity under conditions of condensation (*third revision*)
(Sec 2) : 1989	Keeping properties
(Part 8/Sec 2) :	Tests for pigments and other solids
1990	Pigment and nonvolatile matter
1070 : 1992	Reagent grade water (*third revision*)
1303 : 1983	Glossary of terms relating to paints (*second revision*)
1407 : 1980	Round paint tins (*second revision*)
1745 : 1978	Petroleum hydrocarbon solvents (*second revision*)
2552 :1989	Steel drums (galvanized and ungalavanized) (*third revision*)
6947 (Part 2) : 1975	Methods of estimation of composite pigments in oil pastes and ready mixed paints: Part 2 Estimation of zinc chomes, ferric oxide and aluminium
8766 : 1978	Specification for driers for paints
10897 : 1984	Zinc phosphate pigment for paints

ANNEX B

[*Table* 1, *Sl No.* (ii)]

CONSISTENCY

B-1 APPARATUS

B-1.1 Palette Knife or Metal Rod

B-1.2 Steel Panels

Unless specified otherwise, mild steel panels of size 150 mm × 50 mm × 1.25 mm shall be prepared as prescribed in **2** of IS 101 (Part 1/Sec 3).

B-2 PROCEDURE

B- 2.1 Insert a clean metal rod or palette knife into the original container and examine the nature of settling.

B-2.2 Observations

The material shall not cake hard inside the container and shall be in such a condition that stirring easily produces a smooth uniform paint suitable for brushing without producing appreciable drag on the brush or spraying as required.

ANNEX C

[*Table* 1, *Sl No.* (vii)]

DETERMINATION OF ZINC PHOSPHATE CONTENT IN PRIMER

C-0 GENERAL

The pigment is extracted from the paint and pigment is taken for the determination of zinc phosphate content.

C-1 OUTLINE OF THE METHOD

The method for the estimation of phosphates is based on precipitation of quinoline phosphomolydate and determined gravimetrically. Main advantage of this method over ammonium phosphomolybdate is that the quinoline phosphomolybdate is less soluble and has constant composition. Besides, calcium, manganese and alkali metals do not interfere in the method.

C-2 REAGENTS

C-2.1 Quinoline solution

Dissolve 50 ml quinoline in a mixture of 60 ml hydrochloric acid and 30 ml water with constant stirring. Cool the solution and filter. Dilute the solution to 1 000 ml and store in a polyethylene bottle.

C-2.2 Solution A (Citric Molybdic Acid Reagent)

Dissolve 54 g of pure molybdic anhydride and 12 g of sodium hydroxide in 400 ml of hot water with constant stirring and cool the solution. Dissolve 60 g of citric acid in a mixture of 140 ml hydrochloric acid and 200 ml of water and cool the solution. Now add molybdate solution to citric acid solution gradually with constant stirring. Cool, the solution, filter and make up the volume to 1 000 ml (solution may be green or blue colour on its exposure to light). If necessary add 0.5 percent potassium bromate solution drop until the green colour becomes pale. Keep the solution in a polyethylene bottle and store in a dark place.

C-2.3 Solution B (Quimociac Reagent)

Dissolve 70 g of sodium molybdate dihydrate in 150 ml water. Dissolve 60 g of citric acid in a mixture of 85 ml nitric acid and 150 ml water and cool the solution. Add molybdate solution to citric acid-nitric acid mixture gradually with stirring, and mark this solution as 1. Now dissolve 5 g of quinoline in a mixture of 35 ml nitric acid and 100 ml water and gradually add this solution to the solution marked 1. Mix the solution well and keep for 24 h Filter the solution, add 280 ml acetone and dilute to 1 000 ml with water. Mix the solution thoroughly and store in a polyethylene bottle.

C-3 PROCEDURE

C-3.1 Weigh accurately about 1 g of the pigment in to a 250 ml beaker and dissolve it with 30 ml dilute nitric acid and 3 to 5 ml of dilute hydrochloric acid. Boil the solution till organic matter is destroyed. Filter though a quantitative filter paper. Collect the filtrate in a 200 ml flask and make up the volume to the mark with water.

C-3.2 Pipette out 50 ml of this solution (*see* **C-3.1)** (containing not more than 25 mg of (P_2O_5) in to 500 ml conical flask and dilute to 100 ml with water. Treat the solution by one of the following method:

a) Add 30 ml of solution A and boil gently for 3 min (solution must be free from precipitate at this time). Remove the solution from the heat and swirl carefully. Immediately add 10 ml quinoline solution from the burette with continuous swirling (add 3 to 4 ml drop wise and balance in steady stream).

b) Add 50 ml of solution B, cover the flask with watch-glass and place it on a hotplate in well-ventilated hood and boil the solution for 1 min.

C-3.3 Cool the solution to room temperature with occasional swirling during cooling. Filter the solution into a Gooch crucible provided with glass fibre or filter paper, previously dried at 250°C and weighed. Wash the precipitate five times with 25 ml portion of water in each time. Dry the crucible and its content for 30 min at 250°C. Cool it in a desiccator and weigh. Repeat the process of heating and cooling till a constant weight is obtained. Calculate the weight of the quinoline phosphomolybdate precipitate by difference.

C-3.4 Carry out a blank test in the same way as the determination but omitting the test portion.

C-4 CALCULATION

Zinc phosphate content, percent by mass in the pigment $= \dfrac{M_1 - M_0 \times 0.381\ 6 \times 100}{M}$

where

M_1 = mass of the residue obtained in the sample, in g;

M_0 = mass of the residue obtained in the blank test, in g; and

M = mass of the pigment taken, in g.

ANNEX D

(*Foreword*)

COMMITTEE COMPOSITION

Paints, Varnishes and Related Products Sectional Committee, CHD 20

Organization	*Representative(s)*
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